

COMMISSIONING DETAILS FOR SATCHNET NETWORKING SYSTEMS AND PRODUCTS

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SECTION 1 – WIRING PRACTICES

This section sets out the standard specification for Satchnet Field Wiring. The purpose of this specification is to install and commission the products to ensure the compliance with EMC Directives (89/336/EEC and 92/59/EEC). Adherence to this specification will also prevent failure or mis-operation of the Satchnet networking system due to the ingress of electrical noise.

INTRODUCTION

Scope

This specification covers:-

- Satchnet field wiring standards and practice, with reference to the protection of the Satchnet Networking System against electrical noise.

This specification does NOT cover:-

- The protection of the cables against damage (mechanical, thermal, chemical, radiation, etc)
- Insulation grades of cables
- Fire resistance, flammability of cables
- Smoke/Fume emission of cables

DEFINITIONS/EXPLANATORY NOTES

For the purpose of this document, the following definitions apply:-

- Extra-Low Voltage (ELV)

Normally not exceeding 50Vac or 120Vdc whether between conductors or to Earth

- Low Voltage (LV)

Normally exceeding extra-low voltage but not exceeding 1000Vac or 1500Vdc between conductors or 600Vac or 900Vdc between any conductor and Earth

Note: These definitions are taken from the BS7671 Requirements for Electrical Installation.

- Input/Output signal terminals

Terminals on a Satchnet Networking controller which connect directly to the internal circuitry of the controller

This **EXCLUDES**:-

- Power supply connections

BASIC RULES

Satchnet Networking products input wiring must be carried out using screened cable. (IAC600 up to 100m no screen required. 101 to 300m screen required).

Satchnet Networking products serial link wiring must be carried out using screened twisted pair cables.

All Satchnet field wiring cable conductors must be dedicated: conductors may not be shared. (See "Definitions/Explanatory Notes").

See relevant Data Sheets for cable detail.

IAC600 - DS 2.951A

CSMC - DS 2.541A

MMC - DS 2.71A

MMC3601 - DS 2.751A

MMC3701 - DS 2.701A

IAC400 - DS 2.801A

CABLE SPECIFICATION

Cables will incorporate a tinned copper conductor or conductors of cross-sectional area 0.22mm², 0.52mm² or 0.75mm² PVC insulated.

Cables preferably will be multi-strand (e.g. 7/0.2, 16/0.2 or 24/0.2). However, equivalent single conductor cables will be considered.

Cable cores are to be arranged in identifiable pairs. These pairs will normally be screened individually.

Multicore cables are comprised of a number of pairs within a common overall screen may be used provided that the installation guidelines for Satchnet cables are followed (See "Installation").

The cable is to be sheathed overall in PVC.

The serial link (RS485/422) cable should be screened twisted 0.21mm² or larger conductor, solid or stranded wire with a maximum dc core resistance of 12 Ω per 100 metres and maximum capacitance between the conductors of 60 pico Farads (pF) per metre.

Non-Preferred cables

The following cable types are not recommended due to the physical difficulty of glanding and termination:-

- Mineral Insulated Cables (MICC)

Part No.0/876-4-600-0-3

CABLE SIZES AND LENGTH OF RUN

The table below gives details of maximum cable lengths and recommended sizes for various functions.

For cable runs greater than those listed, please refer to Invensys Climate Controls Europe.

NOTE: Also refer to relevant Data Sheet.

TABLE 1 – MAXIMUM CABLE LENGTHS							Input	Input	Input	Output	Output	Output	Output	Output
Cable Size	AWG	Diameter mm (Nominal)	Cross Sectional Area mm ²	R/kM Ω	R/kM (Loop) Ω		DRT, DWT, DOT, DST, DDT, DDU, DDH, DRH (0-10Vdc Signal)	RPP, RPW, DRT (Adjustable) RDE	VFC Override Timeswitch Etc.	XRM	ALX, ALXS, ARX, Relays	0-10Vdc Signal to ALE, ALES, ARE, ARES, AVUE	24Vac Supply to ALE, ALES, ARE, ARES, AVUE	^a LAN COMMS Cable
						Max. Ω per conductor	15 Ω	10 Ω	5 Ω	10 Ω	5 Ω	50 Ω	3 Ω	120 Ω
							Max. recom -mended metres	Max. recom -mended metres	Max. recom -mended metres	Absolute Max. metres	Max. recom -mended metres	Max. recom -mended metres	Absolute Max. metres	Max. recom -mended metres
7/0.2	24 23	0.6	0.21 0.219 0.259	86	176		170	110	55	b 110	b 55	Max. Distance 300	b 30	Max. Distance 1000
16/0.2	21 20	0.93	0.412 0.52 0.556	38	76		Max. Distance 300	265	130	b 265	b 130	As Above	b 75	Max. Distance 1000
24/0.2	19 18	1.14	0.636 0.75 0.826	25.5	51		Max. Distance 300	Max. Distance 300	195	b Max. Distance 300	b 195	As Above	b 115	Max. Distance 1000
32/0.2	18 17	1.34	0.826 1.005 1.04	19.1	38.2		Max. Distance 300	Max. Distance 300	260	b Max. Distance 300	b 260	As Above	b 115	Max. Distance 1000

a Communication (LAN) cable:- <60pF per metre.

b 1.5mm² core unscreened cable may be used for distances up to 100 metres. Also refer to Data Sheet for maximum impedances and lengths.

INSTALLATION GUIDELINES

Termination of Satchnet field wiring should be made at a dedicated location or terminal rail, segregated from other terminals.

e.g. within a motor starter panel, a separate terminal rail (or section of rail) should be employed.

Where a common terminal rail is employed, a separation of 100mm between Satchnet field wiring terminals and other terminals, must be maintained. Satchnet field wiring from the terminal rail to the networking controllers should be segregated from Mains and Power wiring by running it in a separate trunking, tray or harness.

Screening of multicore cables, or individual pairs must be continuous.

The screen of the cable must only be earthed at the common earth point.

The common earth point should be connected to the controller earth (0V Terminal) by a single cable which should be as short as possible and no more than 150mm long.

The serial link cable must be screened and earthed at a common earth point, located near to the personal Computer, not at the controller devices. IAC200/400/600, Touch-screen and CVR serial link screens must be connected to the IAC/Touch-screen/CVR isolated earth terminal.

Non preferred cables (e.g. MICC)

Where these types of cables are mandatory, it is recommended that they be terminated within a purpose-made terminal box immediately adjacent to the network products cable entry point, and that final connections to the network products be made using flexible, screened cables as described above.

Since the copper sheath of the Mineral insulated cable forms the earthed screen of these cables, only Satchnet controller Input conductors at extra low voltage may be contained within the cable sheath.

CONDUCTOR FUNCTION

Conductor functions may not be shared. Each input pair shall have a dedicated 0V conductor as part of the pair.

Two or more Input/Output signals may NOT share a common 0V conductor.

Under no circumstances shall Input signal cables share a common 0V conductor with a power supply (e.g. to active sensors or actuators). Where a field device such as a sensor or actuator employs a common 0V termination for both power and signal, then two 0V conductors must be taken to the device: one for signal, one for power.

SECTION 2 – COMMUNICATION SCHEMES

All IAC RS485 communication ports are optically isolated, which protects the units from differential ground potentials e.g. earth loop damage.

The RS485 mechanism works through a differential voltage which must be referenced to a level, which is provided by the communication cable screen making a 3 wire system.

To make communication as reliable as possible, the screen must be connected to isolated ground as follows:

IAC 400

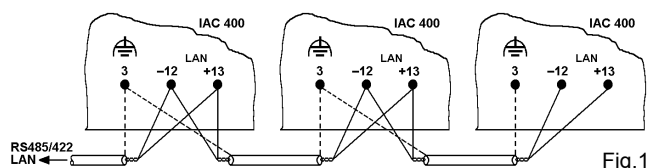
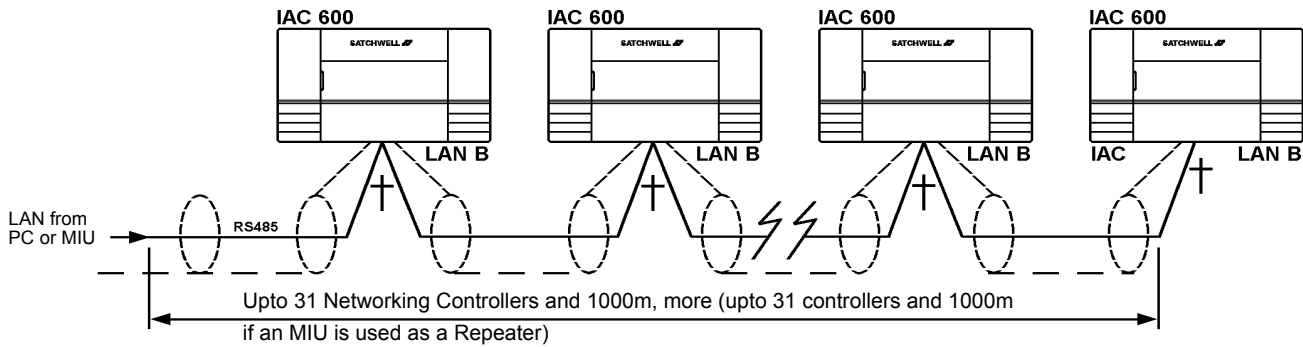


Fig.1

IAC BASE UNITS ON A LAN (NO TOUCH-SCREENS)



LAN B should be screened with the screen earthed only on a verified earth at the computer or MIU.

† LAN A and B screens should be connected to the isolated Ground Terminals of each of the IACs on the LAN - see Fig.3A.

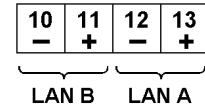
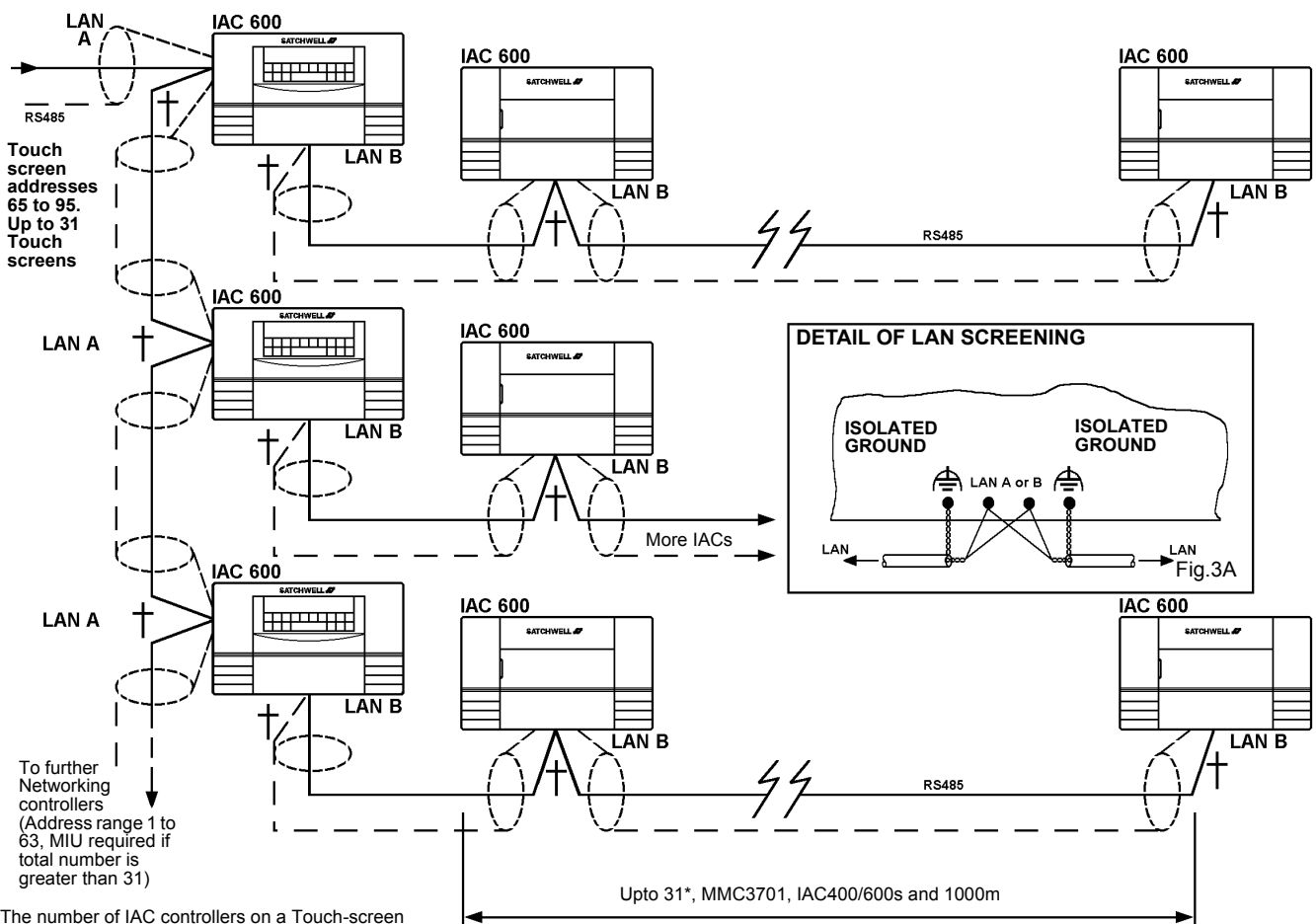


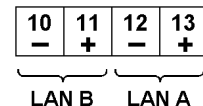
Fig.2

IAC TOUCH SCREENS AND BASE UNITS ON A LAN



*The number of IAC controllers on a Touch-screen Sub LAN is limited to 32 base units including the one the Touch-screen is plugged into. Each Touch-screen can display upto 256 parameters.

Controllers (including MIUs) on the main LAN and sub-LAN must not have conflicting addresses. Controllers on different sub-LANs may use the same address. Ideally the sub-LAN addresses should be kept within a range so as not to use up all of the main LAN addresses.



LAN B should be screened with the screen earthed only on a verified good earth at the computer or MIU.

† LAN A and B screens should be connected to the isolated Ground Terminals of each of the IACs on the LAN - see Fig.8.

Fig.3

REMOTE TOUCH-SCREEN MOUNTING KIT 565-2-601

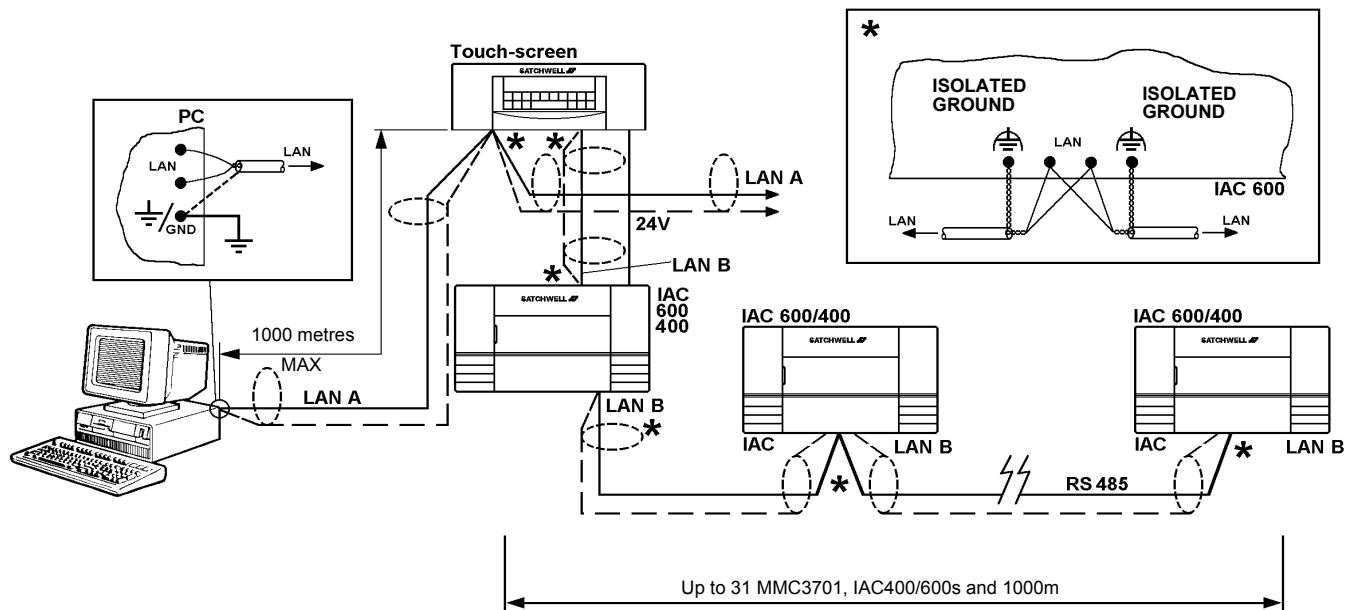


Fig.4

REMOTE MOUNTED TOUCH-SCREEN USING KIT 565-2-601 CONNECTED DIRECTLY TO MMC3701, IAC400 AND 600S (STAND ALONE MODE)

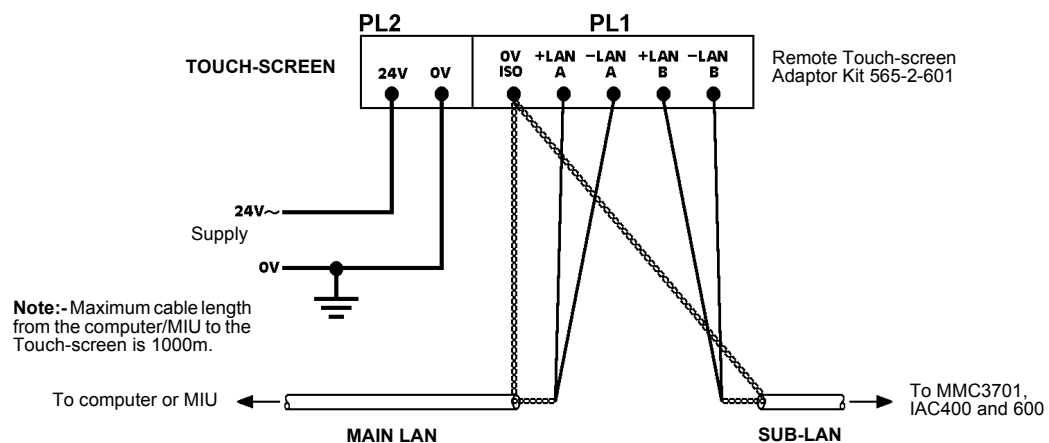


Fig.5

BASIC DIAGRAM FOR MIU 3252

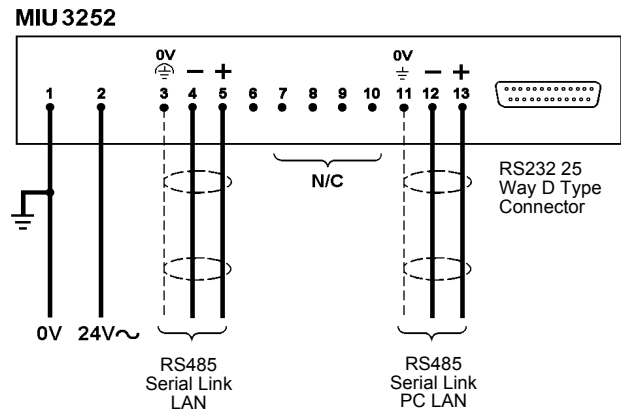


Fig.6

MIU 3252 RS485 REPEATER MODE

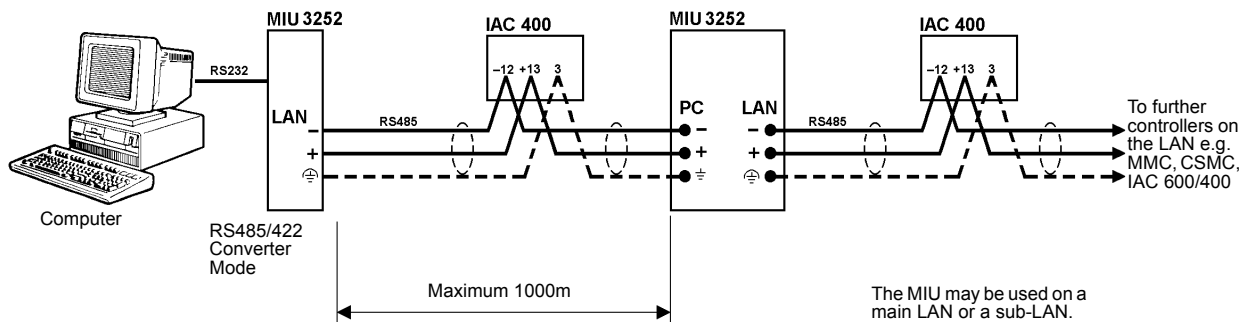


Fig.7

MIU 3252 COMMISSIONING (Repeater Mode)

1. Disconnect power supply.
2. Select mode of operation using bit switch eight.
 - i. OFF for repeater.
3. Select the communication speed for both the PC LAN and LAN by using the jumpers (LK 6 and LK 5 respectively). The communication speeds are marked on the PCB. It is possible to set the LAN communication speed from a computer running Satchnet Networking Software version 6.3 or later, if this is required jumper LK 5 should be removed.
4. Set bit switch 7 to ON if the MIU is to operate as a transparent (Dumb) repeater.
Set bit switch 7 to OFF if the MIU is to act as an addressable repeater.
5. If bit switch 7 is set to ON then bit switches 1 to 6 are ignored and can be left in any position.
If bit switch 7 is set to OFF then bit switches 1 to 6 are used to set the MIU address (see table).
6. Switch on the power.
7. The RUN, MODEM and DUMB LEDs should light simultaneously. The MODEM LED will then go OFF. If bit switch 7 is set to ON then the DUMB LED will also stay ON.

MIU SWITCH OPTIONS WHEN IN REPEATER MODE

SWITCH (Increment No.)	POSITION	
	On (open)	Off
1	1	0
2	2	0
3	4	0
4	8	0
5	16	0
6	32	0
7	Dumb Repeater	Addressable Repeater
8	-	Set to OFF

Address Setting only
used if bit switch 7 is
OFF

8. If the start up sequence does not follow the description in instruction 7 then turn the power off and check that the MIU and controllers have been correctly wired and that there are no short circuits in the communication wiring. Switch on the power and check the MIU start up sequence again. If no obvious fault is found and the MIU still fails to start correctly then the MIU should be replaced.
9. The MIU is now fully operational.

MIU 3252 USED ON A WAN

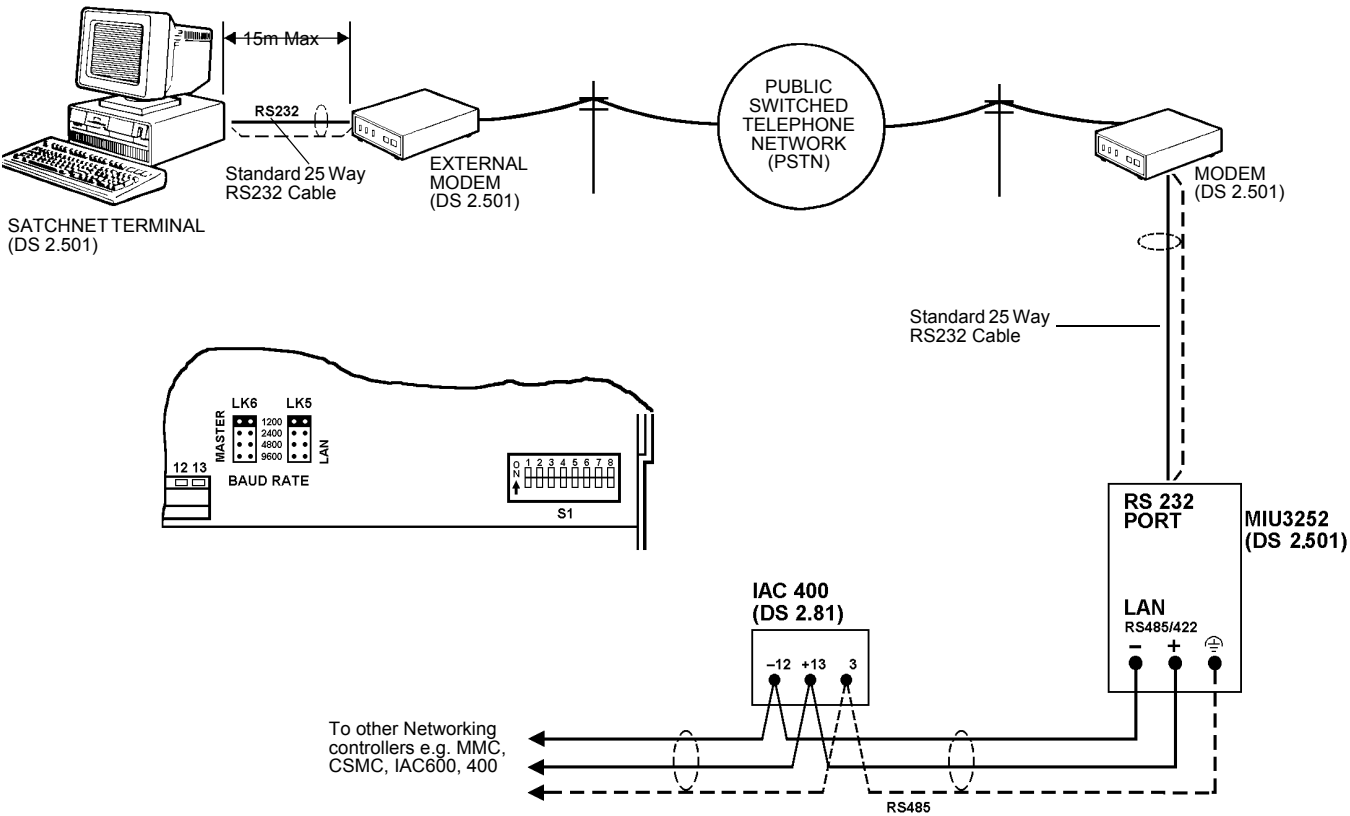


Fig.8

MIU SWITCH OPTIONS WHEN IN MODEM MODE

SW1 SWITCH (Increment No.)	POSITION	
	On (open)	Off
1	Not Hayes Modem	Hayes Modem
2	-	-
3	-	-
4	-	-
5	-	-
6	Reset	No Reset
7	-	Set to OFF
8	Set to ON	-

MIU3252 COMMISSIONING (Modem Interface Mode)

1. Disconnect the power supply.
2. Remove gland plate and using a 25 way ribbon cable connect the MIU to a modem.
3. Select mode of operation from bit switches seven and eight.
Bit switch 7 OFF.
Bit switch 8 ON (modem operation).
4. Select modem type using bit switch 1.
ON - Disable modem initialisation.
OFF - Enable modem initialisation, Hayes command set initialisation string sent to the modem is "ATV0E1M0S0=1Q0".
If ON is selected the modem must be manually configured before connection to the MIU.
5. Bit switches 2 to 5 can be in any position and are ignored.
6. Select the communication speed for both the modem (PC LAN) and LAN by using the jumpers (LK 6 and LK 5 respectively). The communication speeds are marked on the PCB. It is possible to set the LAN communication speed from a computer running Satchnet Networking Software version 6.3 or later, if this is required jumper LK 5 should be removed.
7. Switch bit switch 6 to the ON position. This will ensure that all variables in memory are reset to default values. Switch on the power.
8. The MIU checks the bit switch settings and if the modem is to be initialised the MODEM LED on the MIU will flash at five times per second whilst the modem is being initialised. Once initialisation is complete the MODEM LED will stay ON and the RUN LED will be constantly ON.
9. If the start up sequence does not follow the description in instruction 8 then turn the power off and check that the MIU and controllers have been correctly wired, that there are no short circuits in the communication wiring and that the 25 way connection lead is correctly connected. Switch on the power and check the MIU start up sequence again. If no obvious fault is found and the MIU still fails to start correctly then the MIU should be replaced.
10. Set bit switch 6 to OFF so that if there is a power failure the MIU will not be reset.
11. The MIU is now ready to accept data via the modem. By default the address of the MIU in modem mode will be 0, this cannot be changed.
12. At this stage the autodial telephone numbers, site mnemonic and new poll data may be programmed into the MIU memory. This is achieved by calling up the MIU using the auto answer facility from the Satchnet PC and selecting the MIU.
13. The MIU is now fully operational.

MIU/MODEM

If bad communications are experienced it may be necessary to utilise 'low loss' telephone lines as supplied by the telephone company on certain applications.

MIU 3252 AS AN RS232 TO RS485 CONVERTER - SPEC 585-3-252

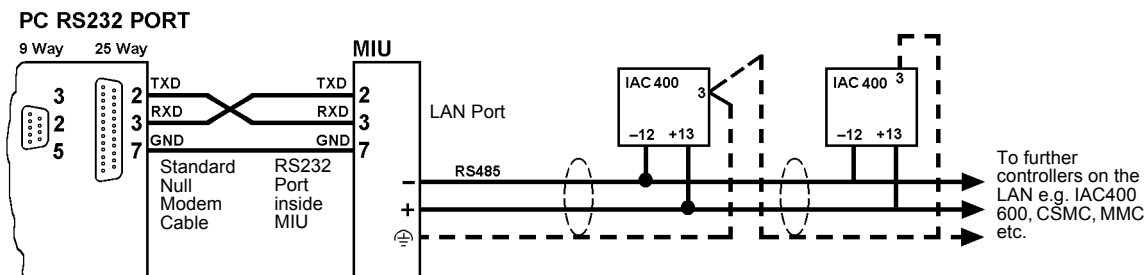


Fig.9

MIU COMMISSIONING (RS 232 TO RS 485 CONVERTER MODE)

1. Disconnect power supply.
2. Remove the gland plate and using a 25 way null modem cable connect the MIU to the computer. Note the computer connector may be a 9 way D type connector, either use a 9 to 25 way adapter or a 9 to 25 way ribbon cable.
3. Select the mode of operation from bit switches 7 and 8.
Bit switch 7 ON (transparent operation).
Bit switch 8 ON (RS 232 operation).
4. Select the communication speed for both the PC and LAN by using the jumpers (LK 6 and LK 5 respectively). The communication speeds are marked on the PCB. It is possible to set the LAN communication speed from a computer running Satchnet
5. Networking Software version 6.3 or later, if this is required jumper LK 5 should be removed. The RUN, MODEM and DUMB LED's should light simultaneously. The MODEM LED will then go OFF.
6. If the start up sequence does not follow the description in instruction 5 then turn the power off and check that the MIU and controllers have been correctly wired and that there are no short circuits in the communication wiring. Switch on the power and check the MIU start up sequence again. If no obvious fault is found and the MIU still fails to start correctly then the MIU should be replaced.
7. The MIU is now fully operational.

WESTERMO MA-42 RS232 TO RS485 CONVERTER

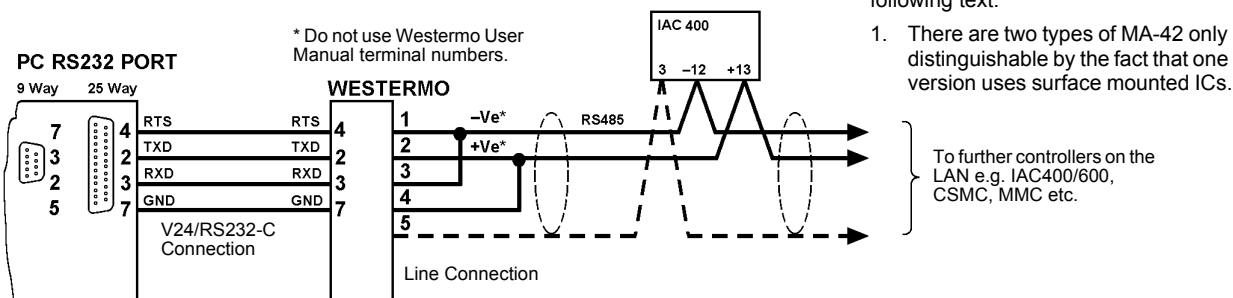
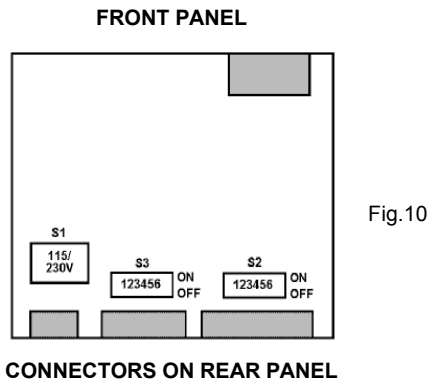


Fig.10

WESTERMO SURFACE MOUNT VERSION MA-42 INTERNAL SWITCH SETTINGS

 Follow the Static Precautions on Page 14.

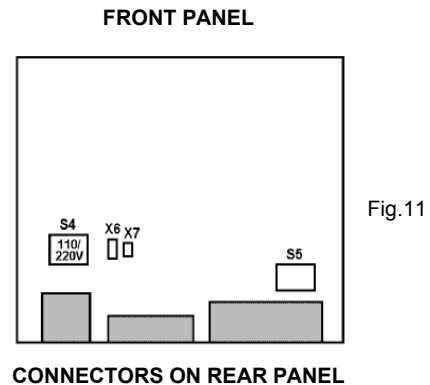
DO NOT OPEN THE MA-42 UNTIL THE MAINS WIRING HAS BEEN DISCONNECTED.
Open the MA-42 as described in its manual. Switch positions are shown below.



WESTERMO NON SURFACE MOUNT VERSION MA-42 INTERNAL SWITCH SETTINGS

 Follow the Static Precautions on Page 14.

DO NOT OPEN THE MA-42 UNTIL THE MAINS WIRING HAS BEEN DISCONNECTED.
Open the MA-42 as described in its manual. Switch and jumper positions are as shown.



SWITCH SETTINGS FOR MA-42 (Article Number 3042-3003)

S1 - set to local power supply 115 or 230Vac

S2

- | | | |
|---------|---|--|
| 1 - ON | } | Transmitter activated by RTS
CTS controlled by RTS
DCD controlled by RTS |
| 2 - OFF | | |
| 3 - OFF | | |
| 4 - ON | | |
| 5 - OFF | | |
| 6 - OFF | | 0ms RTS-CTS delay |

S3

- | | | |
|---------|---|---------------------------------|
| 1 - ON | } | 4 Wire (Full duplex) |
| 2 - OFF | | |
| 3 - ON | } | Receiver terminated
(4-wire) |
| 4 - ON | | |
| 5 - OFF | | |
| 6 - OFF | | |

SWITCH SETTINGS FOR MA-42

S4 - set to local power supply 110 or 220Vac

S5

- | | | |
|---------|---|--|
| 1 - ON | } | Transmitter activated by RTS
CTS controlled by RTS
DCD controlled by RTS |
| 2 - OFF | | |
| 3 - OFF | | |
| 4 - ON | | |
| 5 - OFF | | |

Jumper Settings

X6 - 7 to 8 and 2 to 1 Receiver terminated (4-wire)

X7 - 2 to 1 Four wire (Full duplex)

COMMUNICATION CONFIGURATIONS

AVAILABLE COMMUNICATIONS PORTS

Computer Type	Maximum number of communication ports
AT compatible PC 386/486/ Pentium	3 Ports if a bus mouse is used

Note:
Each available communication port on the computer can be used for a hardwired output (RS422/485) or a modem output (RS232). One modem on the computer will allow access to any number of remote sites. Hardwired sites using stand-alone RS232/485 converters may require extra RS232 ports to be fitted.

Maximum number of controllers on the Network:
The maximum size of the system is determined by the computer used but the following gives some general information:

- Up to 999 hardwired or modem sites per system.
- Each site (hardwired or modem) may have up to 32 controllers on it, to extend this to 63 an MIU must be used.
- It is possible to use more than 63 IACs per LAN by using Touch-screens to create sub-LANs.
- One modem or LAN per computer communications port.
- Maximum number of computer modems or LANs is limited by the number of slots and communication ports supported by your computer - see table for details.

IRQ SETTINGS

No two ports on an AT compatible machine may use the same interrupt level (designated as IRQ numbers 0 to 7).

Serial ports set up as COM: 1 normally use IRQ: 4 and those set up as COM: 2 normally use IRQ: 3. If no COM:2 is fitted, then COM: 3 or COM: 4 may use IRQ: 3, otherwise either IRQ: 5 or IRQ: 7 should be used. You may find interference with other adaptors/devices fitted to your machine so a few attempts may be needed. Test the settings with the SETUP software and observe the IRQ numbers given during automatic configuration. See the Satchnet Reference Manual for details of using the Setup program.

If an RS232 card is installed it is normally preset to COM 1.

HARDWIRED CONFIGURATION FOR OPTO 22 CARDS
RS485 PLUG WIRING FOR OPTO 22 CARDS

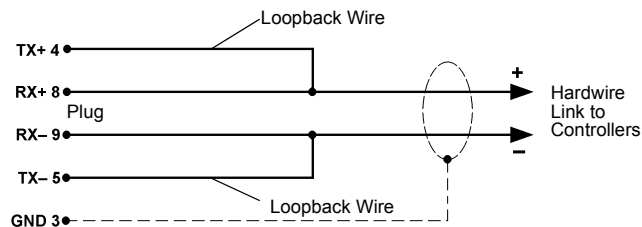


Fig.12

Note:

Pin numbers refer only to the Opto 22 AC24 and AC34 cards. For other adaptors refer to the Pin designations (Tx+ etc) and the manufacturers manual.

The table below details the communications card required for the various IBM models:

Computer	Opto-22 card
PC-AT, PS/2-30 (286)	AC24AT
PS/2-50 and higher	AC32

Note: :

If you have a PS/2, any card installed in your computer will come with a disk of files. The files on the disk allow the computer to recognise the new card. These files should be copied onto your backup reference disk and your computer re-configured in accordance with the card manufacturers instructions.

OPTO-22 AC-24(AT) CARD SETUP

This card is for use with IBM PC-AT compatible and PS/2-30 computers.

Before use the computer may need to be configured from a Reference disk supplied with your computer. This allows the computer to recognise and operate the card. For details refer to the instructions supplied with the card.

Make links B5, B6, B7 and those listed below with all other links removed.

COM 1:		COM 1
COM 2:	A8,	COM 2
COM 3:	A4,	COM 2
COM 4:	A4, A8	COM 2

IMPORTANT

See section called "IRQ SETTINGS" Page 10 for details of IRQ numbers.

OPTO-22 AC-32 CARD SETUP

This card is used in machines that support micro channel architecture cards such as the IBM PS/2-50, 60, 70, 80 and 90 and can provide two independent communication channels. Before use the computer must be configured from the Reference disk supplied with your computer. This allows the computer to recognise and operate the card. For details refer to the instructions supplied with the card.

Jumpers should be set as follows:

- A5, A6 & A7 for channel A
- B5, B6 & B7 for channel B

Use the outputs from connector 1 J1 for channel A and connector J2 for channel B and remove all other jumpers.

PCM COM485 PCMCIA TO RS 485 CONVERTER

Set up the PCMCIA card using the software supplied with the card.

The loopback is pre-wired for the PCM COM485

9 Way Connector

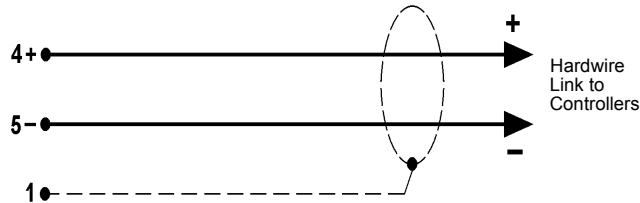


Fig.13

SECTION 3 – MODEM INITIALIZATION FOR SATCHNET

The modems listed here are only for use with Satchnet Software.

For details of Modems supported for other Invensys products please contact your local Invensys agent.

The modem(s) must be initialized with the correct command string.

The initialization (command) string can be set from the communications icon of Satchnet Pro or the modem(s) can be configured from a separate communications package.

If the modem is only to be used with Satchnet, then the AT&W command can be used to fix the configuration in the modems non volatile memory. The AT&F command is used to reset the modem to its factory default settings.

The AT&F and AT&W should not be included in the Satchnet initialization string.

AT&F and AT&W should be sent to the modem when it is first installed to ensure the factory defaults are set in the modem.

PACE, LINNET 12 & 24

Compatible with:- Satchnet 6.1 onwards
MIU

Command string: None required. Factory default.

Notes: Beware of exchanges that have internal ring tones in excess of 1second, the Linnet 24 will not always answer.

PACE, LINNET QUAD FX AND MICROLIN FX

Version 2.02 or later. Contact Pace if you have an earlier version.

Compatible with:- Satchnet 6.1 onwards
MIU

Command string: AT &S1 &K0 \N0 %C0

When a FAX is used &K6 may be written to the Modem. AT &K0 will have to be written back to the Modem for use with Satchnet.

PACE, MICROLIN FX32 PLUS

Compatible with:- Satchnet 6.11 onwards

Command string:- None required. Factory default.

HAYES SMARTMODEM, QUAD

Compatible with:- Satchnet 6.1 onwards
MIU

Command string:- AT &C1 &D2

HAYES SMARTMODEM, OPTIMA 24

Compatible with:- Satchnet Plus (6.20) onwards
MIU

Command string: AT &C1 &D2 &Q0

DOWTY, QUATTRO

Compatible with:- Satchnet 6.1 onwards
MIU

Command string: AT &C1 &D2 &K0 &S0

MULTI TECH, MT1432M

Compatible with:- Satchnet 6.1 onwards
MIU

Command string: None required. Factory default.

US ROBOTICS SPORTSTER 14,400/PC FAX

Internal fax/modem card.

Compatible with:- Satchnet Plus (6.20) onwards

Command string: &B1 &A0 &K0

Bit Switch Settings (Default)

- 1 – Up
- 2 – Up
- 3 – Down
- 4 – Up
- 5 – Down
- 6 – Up
- 7 – Up
- 8 – Down

PSION, BULLDOG

Compatible with:- Satchnet 6.21 onwards

Command string: AT %D1 B0 &G2 &P1 S6=5 S8=5 S7=59
S11=70 X4
AT 4&D2 &C1

PACE, MOBI FAX 144

Compatible with:- Satchnet 6.21 onwards

Command string: AT &K0
AT F4

MULTI TECH, MT1932ZDXK

Compatible with:- Satchnet 6.21 onwards and MIU

Command string: AT &F
AT &E0 &E3 &E14 #F0\$MB1200
&Q1\$SB1200X4
AT &W

MEGAHERTZ USA FAX MODEM

Compatible with:- Satchnet Plus onwards

Command string:- AT &K0 F4

PACE, MOBIFAX 24

Compatible with:- Satchnet Plus (6.20) onwards
MIU

Command string:- None required.
Factory default

US ROBOTICS SPORTSTER VI

Compatible with:- Satchnet Plus onwards
MIU

Command string:- AT &A0 &K0 &M0 &N2 &H0 &R1 &S1

RS COMPONENTS 9000 SERIES

Compatible with:- Satchnet Plus (6.20) onwards

Command string:- AT &C1 &D2 &G2 &Q6 &S1

LASAT SAFIRE 144

Compatible with:- Satchnet Plus (6.20) onwards

Command string:- AT &F
AT &K0 %C0 F4 \N1
AT &W

PACE, LINNET 34

Compatible with:- Satchnet Plus (6.20) onwards

Command string:- AT &C0 \N0 &K0

US ROBOTICS Vi 14.4 28.8

Compatible with:- Satchnet Plus (6.20) onwards

Command string:- AT &F
AT &A0 &K0 &M0 &N2 &H0 &R1 &S1
AT &W

SUPPORTED PAGERS

BRITISH TELECOM TAP PROTOCOL

British Telecom Message Master pager

British Telecom tone Master pager

The BT pager computer telephone number is 0345 581 354

The pager ID number is derived from the pager telephone number (supplied with the pager). To derive the pager ID take the last 6 digits from the pager telephone number and put a 0 at the front of the 6 digits.

Example: Pager telephone number 0893 123456

Pager ID is 0123456

REMOTE PRINTER MODEM INITIALIZATION

The remote printer modem must be setup using a terminal programme running on a PC. The following modem settings are required:-

1. Baud rate set to 1200.
2. DTR to control line connection i.e. when DTR inactive, line drops.
3. Autoanswer mode activated (AT S0 = 1).
4. Quiet mode (AT Q1).

SECTION 4 - POWER SUPPLY WIRING

MULTIPLE CONTROLLERS SUPPLIED FROM A SINGLE TRANSFORMER

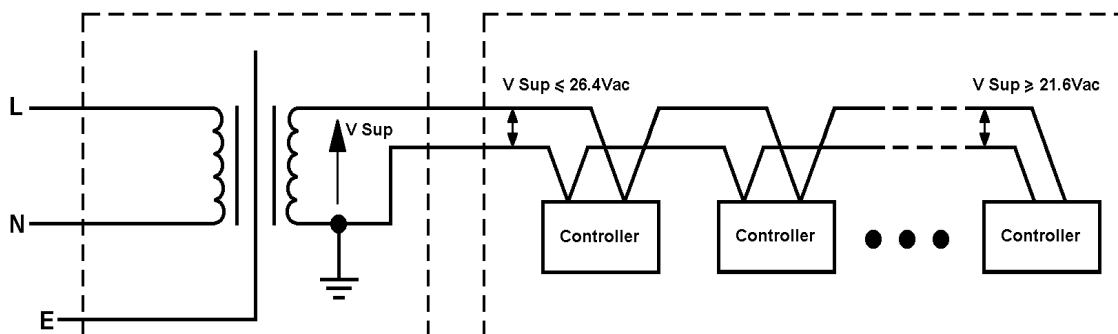


Fig.14

Do not loop the last controller wiring back to the transformer. Ensure the specified supply voltages can be achieved at both ends of the supply wiring. DO NOT EARTH THE SUPPLY 0V LOCALLY.

SINGLE CONTROLLER SUPPLIED FROM A SINGLE TRANSFORMER

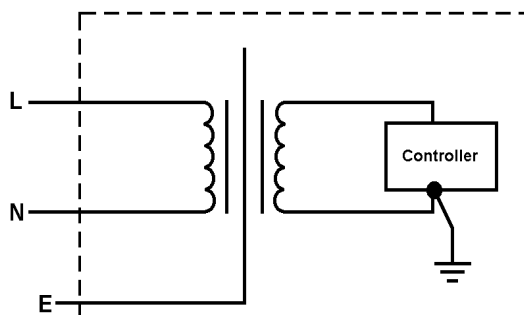


Fig.15

Ensure there are no earth loops in the supply wiring.

SECTION 5 – SETTING THE BIT SWITCH ON IAC400/600 ONLY

The bit switch is used for setting both the unit's address and its preset application. Which function is currently being performed is defined by bit switch 7.

Bit switch 7 OFF - Preset set on bits 1-6

Bit switch 7 ON - Address set on bits 1-6

To enter either the address or preset into the controller toggle bit switch 8 from OFF to ON to OFF again. This causes the controller to reset itself and it is only during such initialization that the preset/address is read from the bit switch. They may be changed via satchsoft at anytime.

When the controller is to use one of the predefined presets, always leave it with the relevant preset selected on the bit switch. This ensures that in the event of memory corruption the controller can reload the defaults applicable to the appropriate preset.

CUSTOM COMPUTER CONFIGURATION

1. IACs should be set to preset 0.

SETTING THE CONTROLLER PRESET APPLICATION

1. Ensure bit switches 7 and 8 are both OFF.
2. Set the preset application number you require using bit switches 1 to 6.

Note: Preset 0 is set by setting bit switches 1 to 6 OFF.

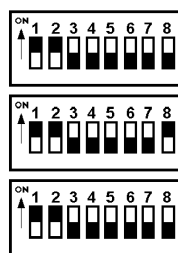
3. Set bit switch 8 to ON.
4. Set bit switch 8 to OFF. This will enter the preset application number into the controller.

SWITCH No.	POSITION	
	ON (open)	Off
1	1	0
2	2	0
3	4	0
4	8	0
5	16	0
6	32	0

Application Preset Number

If you are to download your application from a computer using Satchnet then you must select preset 0 from the bit switch. This will ensure that in the event of a power failure, the software preset will not be overwritten on subsequent power-up.

Example:- Loading Preset 3.



Preset 3, switches 1 and 2 ON
all other switches OFF

Set switch 8 to ON

Set switch 8 to OFF

This procedure will enter the preset application into the controller memory.

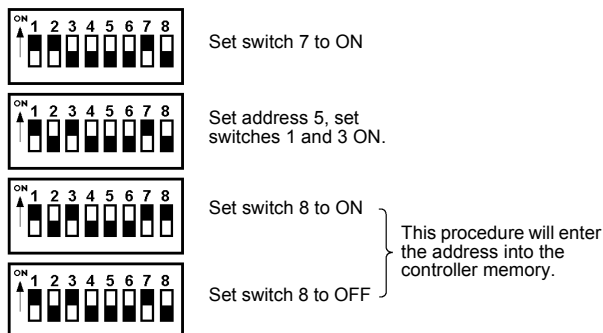
SETTING THE CONTROLLER ADDRESS

1. Ensure switch 7 is ON and switch 8 is OFF.
2. Set the address for the controller using bit switches 1 to 6.
3. Set bit switch 8 to ON.
4. Set bit switch 8 to OFF.

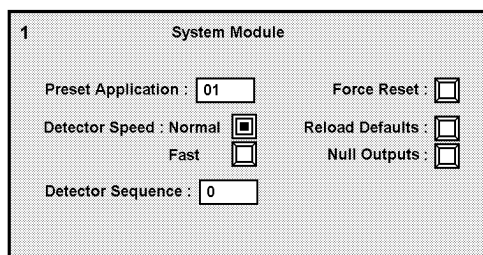
SWITCH No.	POSITION	
	On (open)	Off
1	1	0
2	2	0
3	4	0
4	8	0
5	16	0
6	32	0

Controller Address

Example:- Set address 5.



When using a user defined preset (or customized preset) first make sure that preset 0 is selected via the bit switch. The unit should then be left with the address selected on the bit switches (bit switch 7 ON). This ensure that should data corruption occur the controller will not attempt to load any default values. As the application is user defined the controller cannot know what would be suitable defaults. The preset setting can be checked using Satchnet via the system module.



COLD STARTING CONTROLLERS

In order to cold start an IAC controller (i.e. clear out the configuration data) the following procedure should be followed.

1. Disconnect all outputs from the plant.
2. Set bit switch 1 ON, all others OFF. Toggle bit switch 8. This causes the controller to load preset application 1.
3. Set all bit switches to OFF. Toggle bit switch 8. This causes the controller to load preset 0 (no application).
4. If you are using preset 0 you should now set the controller address. If you are using a hardware preset application set the application number on bit switches 1 to 6 and ensure that bit switch 7 is set to OFF.
5. Once the application number is set it must be entered into the IAC by toggling bit switch 8.
6. If the IAC is not to be connected to a computer then it is not necessary to set an address for it.
7. Set the controller address (if required) on bit switches 1 to 6 and set bit switch 7 to ON.
8. Once the address has been set it must be entered in to the IAC by toggling bit switch 8. The controller address is now loaded and the IAC will communicate at 1200 bps.
9. Re-connect outputs to plant.

Note:

Whenever a firmware upgrade is performed the unit must be cold started.

CONTROLLER LED

Normal Operation

On both the IAC400 and IAC200 controllers the on board LED is under software control and should, under normal operation, flash at a regular interval. The rate of flash is directly proportional to the loading imposed by the application the controller is running, i.e. the more modules you use the slower the LED flashes.

Unit Initialization

Whenever the controller is powered up or reset the LED will initially flash very quickly before adopting the standard flash rate. (Only applies to VAV207, VAS207 and DDC 206 and later versions).

Data Corruption

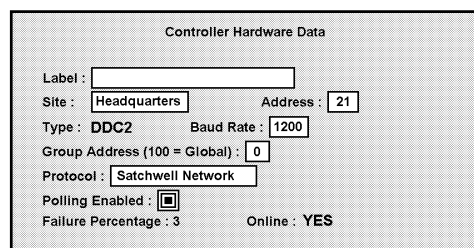
If a controller appears to be continually performing unit initialization, it is likely that data corruption has occurred. Toggle bit switch 8 to reload defaults. Download the configuration from Satchnet if it is a software preset.

SECTION 6 –SATCHNET COMMUNICATION TROUBLE SHOOTING

This section gives guidelines for interpreting the communications failure percentage displayed on Satchnet. It is not intended that this will provide an answer to every problem but providing that the Satchnet wiring recommendations are followed (Section 1) it should be possible to diagnose most communication problems.

Before any analysis of possible problems can be performed, it is necessary to get all controllers on an "even playing field" from the Satchnet point of view. Ideally a duplicate copy of Satchnet should be installed in a separate directory. Controllers should then be created but no parameters extracted from them. Ideally all controllers should be placed on the same Satchnet screen but if this is not possible group them according to location. If possible all controllers should be running the same application or no application. By following this procedure you ensure that the polling of the controllers is evenly spread and thereby make the communication failures statistic comparable between controllers.

To view the failure percentage of a controller you must click on the controller with the RIGHT button. The following window is displayed.



The operation of the failure statistic is influenced by many things such as:

Protocol used,
Satchnet polling used,
Relative controller transceiver transmitter strengths,
Location of failing controller.

The precise nature of the failure percentage and how one failing controller affects another is therefore site specific. However, some general trends have been noted.

A failure percentage of 0-10% does not generally have a detrimental effect on system performance. Some messages may fail but are automatically re-tried by Satchnet. Where MIUs and IAC touch-screens are used, there may be a slight increase in failure percentage of 2-3% due to the message buffering these products introduce.

Where two controllers have been given the same address the failure percentage of that address will typically range from 40-90%. Other working controllers will be affected and their failure percentages will typically range from 10-30%.

Where a controller or group of controllers have a 100% failure rate, suspect either addressing, wiring or hardware faults.

In general when tracing communications problems always start with the unit with the highest failure rate. Isolation of this unit may well improve the failure rates of the other controllers. The LAN may be split up to help locate the fault.

GROUP ADDRESSING

The IAC200/400/600 may belong to 10 groups. The IAC200/400/ 600 will accept a group message if the message group address matches any one of programmed group addresses.

Do not mix different controller types on the same group address. This will result in corruption of the slave controller.

ADDRESSING CONVENTIONS

Where IAC600 Touch-screens are used on a LAN the following addressing convention should be adopted.

MIUs used in 'modem mode' to be address 0.

Controllers on Slave LANs to be addressed 1-31.

Controllers on the Master LAN to be addressed 32-63.

IAC600 Touch-screens to be address 65-95.

BUBBLELAND

Saving Configurations

Before saving a controller configuration to disk it is recommended that the data is first uploaded from the controller. Satchnet Pro will automatically prompt for this. Failure to do this may result in uninitialized data being saved as part of the configuration which will cause IAC controllers to reset when this data is subsequently sent to them.



Always wear your wrist strap



SECTION 7 – UPGRADING IAC FIRMWARE (EPROM)

STATIC PRECAUTIONS

The components within this product can be damaged by static electricity. In view of this anti-static precautions should be taken when changing jumper, firmware (EPROM) or handling the PCB.

When upgrading controller firmware from versions 1.XX to 2.XX the following procedure should be followed if a software preset is used.

With version 1.XX.

1. Enter the configuration library, select load a configuration from disk and note the file name of the application you wish to upgrade.
2. Enter Bubbleland and for each module used make a note if it's instantiation number (top left of the parameter box) and the value/state of all the associated parameters.
3. Exit from Satchnet. The file noted in step 1 has a name that consists of the following fields:
 PPPV\$NNNN where;
 PPP = Product identifier (DDC, VAV or VAS etc)
 V = Version number (i.e. 1 for 113, 2 for 206, 207 etc)
 NNN = Configuration number
 Enter the SATCHNET/LOG directory and copy PPP1\$NNNN.* to PPP2\$NNNN.*
4. Upgrade the Controller firmware.
5. Perform a cold start, setting the same address as used before.
6. Run Satchnet.
7. Enter Bubbleland and select the system module. Put the controller into 'NULL OUTPUT' ('GO SAFE').
8. Exit Bubbleland, select 'configuration library' and load the appropriate configuration from disk. When prompted with 'Send configuration to controller?' select NO. This will set up the bubbleland configuration screen but will not send any parameter values.
9. Enter Bubbleland. Using the notes made in (2) re-enter the modules parameter data.
10. Take the controller out of 'NULL OUTPUT' ('GO SAFE').
11. Select the configuration library option from the controller main menu and perform a "get data from controller".
12. Save the new configuration to disk.

CONFIGURATION BACK-UP

Check the configuration is operating correctly by resetting controller. All parameters are checked on power up. If the Null Outputs button on the System Module is ON the controller contains corrupt data. The controller will need to be cold started and the corrupt parameter must be re-entered.

Always 'get data' from controller before saving configuration to disk.

Put parameter values under the modules in bubbleland so that in the unlikely event of losing the data they may be reprogrammed easily.

SECTION 8 – SATCHNET DATA FILES

INTRODUCTION

This section provides information about the files which Satchnet creates when in use and which may be needed to back up a system or transfer a system from one machine to another.

When graphics or controllers are created in Satchnet, information about them is stored in disk files. These files are divided amongst several directories but all of the files together specify the current state of the system.

THE SCN DIRECTORY

The SCN directory holds several different files but these must be considered as a set. NEVER mix files from different Satchnet systems or the results will be highly unpredictable.

An example of the SCN directory would be:-

0.SCN	the graphics of the root screen
1.SCN	the first subscreen
2.SCN	another subscreen
VALS.DAT	.
SCRN.DAT	.
PRDCTS.DAT	. Various system data files
TYPES.DAT	.
LIMS.DAT	.
SITES.DAT	.
LABELS.DAT	.

The SCN directory holds all the information needed to build up the presentation graphics of your system along with alarm limits and the last-read values of all active symbols.

THE LOG DIRECTORY

The LOG directory is used to hold data which is associated with specific controllers and may be used to configure them. There may be a very large number of files in this directory, falling into three main categories:-

Controller files	-	Store information specific to each controller in the system, and referenced by address
Log Files	-	Store logged data
Config library files	-	Hold controller data for the config library

Controller Files

For every controller on the system, there are one or two files held in the LOG directory.

These files are named using the site number and controller address to ensure that the filenames are unique.

In the following, SS is the site number, i.e. the item number in the site list of the site which the controller is designated as being on. AA is the controller address, specified on the controller bit switch or by other means as appropriate.

Controller .Dat Files

SS_AA.DAT e.g. 1_21.DAT

There is one of these files for each controller on your system. They hold a copy of all the data in the controller from when it was last accessed.

Controller Bubble Files

SS_AA.BUB e.g. 1_21.BUB

There is one of these files for each IAC type controller on your system. They hold the graphic information to form "Bubbleland" and are vital if the bubbleland of a controller is to be accessed. .BUB files are stored in addition to .DAT files.

Touch-screen Files

HNDAA.DAT

SS_AA.TCH (Satchnet V6.2 and later)

There is one of these files for each touch-screen configured by the system. This file holds all the menus and view parameters for the touch-screen. This file is additional to the .DAT file.

Logged Data Files – Prior to Satchnet V6.2

These files store logged data, either from Satchnet based logging, or from controller based logging such as that carried out by the CSMC.

e.g. GRA16.LOG

One of these files is present for each logging parameter on your system and additional files if CSMC logging is used. The number is referred to an item in the .SCN directory and so these files cannot be accessed unless kept along with the .SCN directory they were created with.

Logged Data Files – Satchnet V6.2 and later

Logs are stored in the following files:-

LG_MM_YY.DAT
LG_MM_YY.REC

Where MM = Current Month
YY = Current Year

All logs are stored in the same file. Files from previous months may be back up and/or deleted.

Configuration Library Files

The configuration library option causes files to be saved - or rather copied within the LOG directory. The filenames used are - for example:-

DDC1\$001.LIB
DDC1\$001.BUB

The names of these files are constructed as followed:-

XXXX\$NNN.LIB and XXXX\$NNN.BUB

where

XXXX is the controller type I.D.

and

NNN is generated as a number from 001 to 999 but can be any three characters.

The numbers are generated automatically whenever a library file is saved. If you wish to copy a file to a new system - or 'lock a file' within a system, the files may be renamed such that the last three characters are not numbers. When transferring a library file pair, it is always wise to rename the last characters to ensure that the file will not overwrite an existing configuration. The user-defined label, which can be viewed from within Satchnet, is held inside the file.

Satchnet systems are supplied with a set of library files named:

XXXX\$.PRN.LIB

which contain the controllers pre-sets (N being the pre-set number).

The file with the extension .LIB is identical in format to the .DAT file.

The file with the extension .BUB is identical to the normal controller.BUB files and will only be present if the controller is an IAC type.

Although the .LIB files may be copied from one system to another, great care is needed to ensure that compatibility is maintained. In Satchnet version 6.11, the file MUST be used with the same .CNF file as was in use when it was created. This restriction does not continue to .LIB files created with version Satchnet Plus (6.20) although files created with version Satchnet Plus (6.20) cannot be read by version 6.11.

If there is any doubt as to the compatibility of .LIB files, the following upgrade procedure should be used:

Use this procedure if a .LIB and .BUB of uncertain compatibility is to be transferred to a new system.

1. If a controller is present on the system, already programmed from the .LIB and .BUB files on the old system, skip straight to 3). This is a much easier procedure and should be followed wherever possible.
2. Using the old system, go into bubbleland and note down all significant values of the parameters within the modules.
3. From configuration library, select 'Load Configuration from Disk'.
4. Pick out the configuration you require and answer 'No' to 'Transmit data'.
5. If the controller is already programmed with the configuration (by the old system), you may skip to section 7).
6. Go into bubbleland and then, in each module, program the correct parameters - as noted in section 2).
7. Select 'Get Controller Data' and wait for all data to be read.
8. Save the new format files in the configuration library. Delete the old files as soon as possible to remove possible confusion.

IMAGES AND BACKGROUNDS

Satchnet Pro is supplied with a set of bit-map graphics (.CUT format) which may be used to build up the screens. Backgrounds are held in the BACKGRD directory while smaller images are placed in the IMG directory. In some systems, these will be extended and any extra files must be kept as part of the system configuration. It is also possible for a system to have additional images added to the SYM directory in order to provide extra active symbols.

THE SATCHNET ROOT DIRECTORY

Some significant files are present in the main Satchnet directory.

These are:

ALMCNF.DAT	Holds the setup of the various alarm types.
ALARMS.DAT	The alarm history list.
PASSE.FIC	The current users and passwords.
POLL.SCH	Polling time schedules.
LOGON.DAT	The user logon list.
PARAM.DAT	Various setup items including mouse speed, COM ports, time-outs etc. This file is created by SETUP.EXE.

All other files in the Satchnet main directory are supplied.

The .CNF Directory

The .CNF directory will be almost empty in production software under normal circumstances. The only file present will be a file called '0' which is there simply to ensure that the directory is created. All .CNF files used by the system are included in the file CNF.PAK which is present in the main directory. If you have a system which has some .CNF files in the .CNF directory, they should not be necessary with a new system. Satchnet will always use a .CNF file from the .CNF directory in preference to the CNF.PAK file.

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WARNING -

THESE DEVICES ARE AT MAINS AND/OR LOW VOLTAGE. DO NOT EXCEED RATED VOLTAGE. LOCAL WIRING REGULATIONS AND USUAL SAFETY PRECAUTIONS MUST BE OBSERVED.

Cautions

- Ensure good earthing.
- **STATIC PRECAUTIONS:** The components within these products can be damaged by static electricity. In view of this anti-static precautions should be taken when changing jumper, firmware (EPROM) or handling the PCB.
- Do not apply any voltages until a qualified technician has checked the system and the commissioning procedures have been completed. If any equipment covers have to be removed during the installation of this equipment, ensure that they are refitted after installation to comply with UL and CE safety requirements.
- Observe wiring precautions.
- Do not exceed maximum ambient temperature.
- Interference with parts under sealed covers invalidates guarantee.
- Design and performance of Invensys equipment is subject to improvement and therefore liable to alteration without notice.
- Information is given for guidance only and Invensys does not accept responsibility for the selection or installation of its products unless information has been given by the Company in writing relating to a specific application.
- A periodic system and tuning check of the control system is recommended. Please contact your local Invensys service office for details